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A MICROSCOPE ATTACHMENT,

FOR USE WITH SOLAR OR ARTIFICIAL LIGHT FOR PROJECTING, OR PHOTOGRAPHING, MICROSCOPIC OBJECTS WITH OBLIQUE ILLUMINATION, OR PROJECTING OPAQUE OBJECTS.

L. D. McIntosh, M.D., Chicago, Ill.

Before describing this attachment it will be necessary for me to describe my solar microscope and stereopticon combination (see cut, Fig. 1). This combination was shown and described at the meeting of this Society in Chicago, Ill. As this new attachment is used with it I will be as brief as possible.

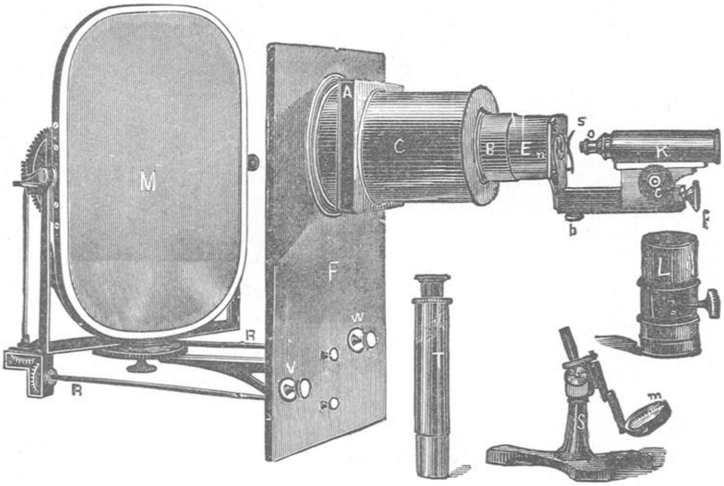

Fig. 1.

The optical parts can be used with either solar or artificial light, with only slight changes.

To use sunlight I have a plane mirror, M, 12 x 14 inches, which turns on a vertical horizontal axis by means of spur wheel gears connected with rods, R, R. The gears are supported by a bracket, which is securely clamped to a perpendicular board F. On the front of this board is an opening to receive the condensing lens, which is mounted in a brass tube C, with draw tube. The draw tube E has a screw thread to receive either the microscopic attachment K, for projecting microscopic objects, or a stereopticon lens for projecting photographic transparencies. By means of the thumb wheels V, W, the mirror can be adjusted at any angle desired for illuminating a transparency or microscopic object.

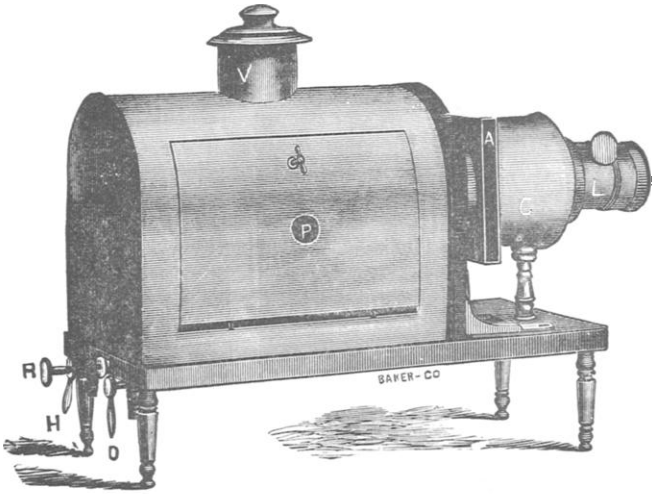

Fig. 2.

To use the solar microscope or stereopticon, place it in a window exposed to direct sunlight, and adjust the mirror so that the light enters the condensing lens parallel with its axis; adjust microscope or stereopticon lens; place the object on the microscope stage, or, if a transparency, in front of the condenser, and a well-defined image is seen on the screen.

To use the optical parts of the instrument just described, with artificial light, viz., oxy-hydrogen or electric, remove the brass tube C, containing the condensing lens and draw-tube, from the mirror attachment and connect to the combination stereopticon (Fig. 2), using either the stereopticon lens or microscope, as desired. The light is centered and adjusted by means of thumb screws on the oxy-hydrogen jet. The adjustment is the same as with solar light. The only change (two condensing lenses are used with artificial light), one of these lenses is removed and only one used, and a small secondary condenser placed under the stage of the microscope. With this combination just described we can only project, with transmitted light, transparent objects.

A few months ago Mr. D. Powell Johnson of Muscatine, Iowa, told me he had photographed diatoms, by means of oblique illumination, and desired me to devise and make for him an attachment that he could use on my combination stereopticon ; I had in mind for some time past an attachment for projecting opaque microscopic objects, but for lack of time had not constructed it.

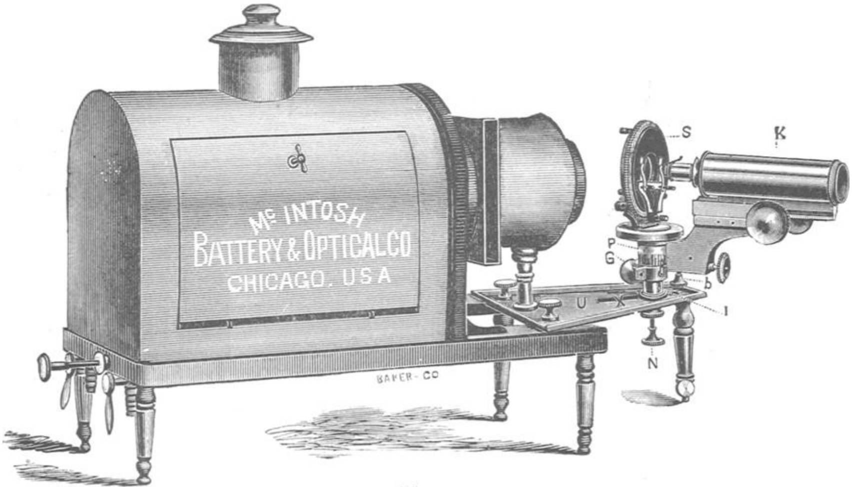

Fig. 3.

The attachment I now show you is a duplicate of the one I made for Mr. Johnson for photographing and projecting objects with oblique illumination, or projecting opaque microscopic objects.

It is constructed as follows: To the base of my combination stereopticon (Fig. 3) is clamped a triangular piece of brass, U, by means of thumb screws, with a slot, X, near its apex, to hold a movable hollow pillar, I. This pillar is slotted on one side, and has a screw and clamp, G, to hold a perpendicular pinion, P, which in turn receives the stage and working part of my professional stand (Fig. 4). This is securely clamped by means of the screw G, Fig. 3.

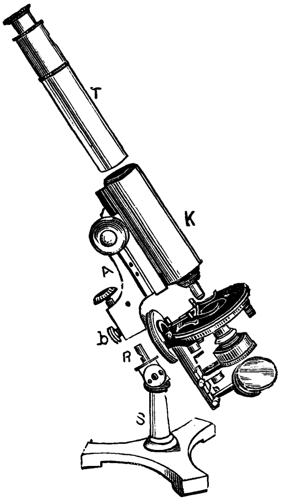

Fig. 4.

Extending through from the lower end of the pillar, I (Fig. 3), is a screw, N, for raising or lowering the stage of the microscope and body tube. The body tube, K, of the microscope is in a horizontal position, and the stage, S, vertical. These are directly in front of the condensing lens.

By means of the pinion, P, in the pillar, I, the microscope can be rotated horizontally to the right or left. The center of an object on the stage corresponds with the center of motion. By means of this rotation any angle, either of solar or artificial light can be obtained for photographing and projecting, also projecting opaque microscopic objects, or projecting with transmitted light.

To use this attachment with solar light the plate, U, can be removed from the stereopticon and attached by means of a bracket to the front of the mirror-board (Fig. 1, F) of the solar instrument, and adjusted the same as with artificial light. For photographing microscopic objects a camera box must be connected with the microscope tube, K, the same as is used with transmitted light to illuminate the object.